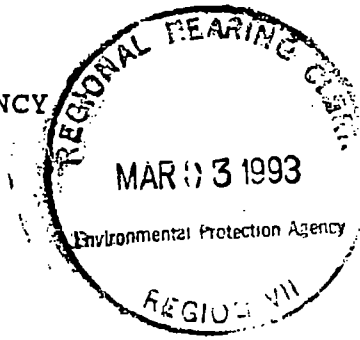


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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION VII
 726 MINNESOTA AVENUE
 KANSAS CITY, KANSAS 66101



IN THE MATTER OF:

COTTER CORPORATION (N.S.L.),

and

LAIDLAW WASTE SYSTEMS (BRIDGETON), INC.,

and

ROCK ROAD INDUSTRIES, INC.,

and

UNITED STATES DEPARTMENT OF ENERGY,

RESPONDENTS.

Proceeding Under Sections 104, 122(a),
 and 122(d)(3) of the Comprehensive
 Environmental Response, Compensation,
 and Liability Act as amended
 42 U.S.C §§ 9604, 9622(a), 9622(d)(3).

Docket No.

VII-93-F-0005

**ADMINISTRATIVE ORDER ON CONSENT
 FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

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I. INTRODUCTION

1. This Administrative Order on Consent ("Consent Order") is entered into voluntarily by the United States Environmental Protection Agency ("EPA"), Cotter Corporation (N.S.L.) ("Cotter"), Laidlaw Waste Systems (Bridgeton), Inc. ("Laidlaw"), Rock Road Industries, Inc. ("Rock Road"), and the United States Department of Energy ("DOE") (Cotter, Laidlaw, Rock Road, and DOE are collectively referred to herein as "Respondents"). This Consent Order concerns the preparation of, performance of, and reimbursement of all costs incurred by EPA in connection with a remedial investigation and feasibility study ("RI/FS") at the West Lake Landfill NPL Site located at Bridgeton, Missouri (hereinafter referred to as "West Lake" or "Site").

II. JURISDICTION

2. This Consent Order is issued pursuant to the authority vested in the President of the United States by Sections 104, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9604, 9622(a), and 9622(d)(3) ("CERCLA"). This authority was delegated to the Administrator of EPA by Executive Order 12580 of January 23, 1987, 52 Fed. Reg. 2923, and was further delegated to EPA's Regional Administrators on September 13, 1987 by EPA Delegation No. 14-14-C. This authority has been redelegated by the Regional Administrator of EPA Region VII to the Director of the Waste Management Division of EPA Region VII by Delegation R7-14-14C dated May 16, 1988.

3. Respondents agree to undertake all actions required by the terms and conditions of this Consent Order. In any action by EPA or the United States to enforce the terms of this Consent Order, Respondents consent to and agree not to contest the authority or jurisdiction of EPA to issue or enforce this Consent Order, and agree not to contest the validity of this Consent Order or its terms.

III. PARTIES BOUND

4. This Consent Order shall apply to and be binding upon EPA and Respondents and their respective agents, successors, and assigns, and upon all persons, including contractors and consultants, acting under or on behalf of Respondents or EPA with regard to the Site. Respondents' participation in this Consent Order, however, shall not be construed as an admission of liability or of EPA's findings of fact or conclusions of law and determinations contained in this Consent Order. The signatories to this Consent Order certify that they are authorized to execute and legally bind the parties they represent to this Consent Order. No change in the ownership or corporate status of Respondents, or of the ownership of the Site, shall alter Respondents' responsibilities under this Consent Order.

5. Respondents shall provide a copy of this Consent Order to any subsequent owners or successors before all or substantially all of the stock or assets are transferred in a corporate acquisition. Respondents shall provide a copy of this Consent Order to all contractors, subcontractors, laboratories, and consultants which

are retained to conduct any work performed under this Consent Order within fourteen (14) days after the effective date hereof or the date of retaining their services, whichever is later. Respondents shall condition any such contracts upon satisfactory compliance with all applicable terms of this Consent Order. Notwithstanding the terms of any contract, each Respondent is responsible for compliance with this Consent Order and shall use its best efforts to ensure that its subsidiaries, employees, contractors, consultants, subcontractors, and agents comply with all applicable terms of this Consent Order.

IV. STATEMENT OF PURPOSE

6. In entering into this Consent Order, the objectives of EPA and Respondents are: (a) to determine the nature and extent of contamination and any threat to the public health, welfare, or the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at or from Radiological Areas 1 and 2, as defined in Paragraph 12, herein, at the Site by conducting a remedial investigation; (b) to determine and evaluate alternatives for remedial action (if any) to prevent, mitigate, or otherwise respond to or remedy any release or threatened release of hazardous substances, pollutants, or contaminants at or from Radiological Areas 1 and 2 at the Site, by conducting a feasibility study; and (c) to recover all response and oversight costs incurred by EPA with respect to this Consent Order in accordance with the procedures set forth in Section XXII (Reimbursement of Response and Oversight Costs).

7. The activities conducted under this Consent Order are subject to approval by EPA and shall provide all appropriate and necessary information for the RI/FS, and for a Record of Decision ("ROD") that is consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. The activities conducted under this Consent Order shall be conducted in compliance with all applicable EPA guidances, policies, and procedures, which EPA will identify in writing in advance. Activities conducted in compliance with this Consent Order shall be deemed in compliance with the NCP.

V. EPA'S FINDINGS OF FACT

EPA makes the following Findings of Fact (contained in Paragraphs 8-31), which Respondents do not admit:

8. The Landfill is comprised of approximately 200 acres located at 13570 St. Charles Rock Road, Bridgeton, St. Louis County, Missouri, and is approximately 4 miles west of St. Louis' Lambert Field International Airport, near the intersection of Highways I-70 and I-270. Limestone was quarried at the Landfill from 1939 to the present. Since 1962 portions of the quarried property have been used for landfilling municipal refuse, industrial solid and liquid wastes, and construction demolition debris.

9. In 1966, the Atomic Energy Commission ("AEC") sold 8,700 tons of leached barium sulfate, together with other radioactive residues, to Continental Mining and Milling Company ("Continental Mining"). The radioactive residues were generated as by-products

of uranium processing performed by the AEC's contractor. These processing residues were stored at the AEC's St. Louis Airport Storage Site ("SLAPSS").

10. Continental Mining removed the radioactive residues to its facility at 9200 Latty Avenue in Hazelwood, Missouri. Eventually, Cotter purchased the radioactive residues and shipped all but the 8,700 tons of leached barium sulfate to its processing facility in Colorado.

11. In 1973 approximately 8,700 tons of radioactively contaminated leached barium sulfate residues were mixed with approximately 39,000 tons of soil, and the entire amount was disposed of in Radiological Areas 1 and 2, which are described in Paragraph 12, at the Landfill. This material resulted from decontamination efforts undertaken by Cotter at 9200 Latty Avenue, St. Louis, Missouri, where the residues had been stored.

12. In 1978, an aerial survey sponsored by the Nuclear Regulatory Commission ("NRC") revealed two areas within the Landfill where gamma radiation levels indicated radioactive material had been deposited. In 1980-81, Radiation Management Corporation ("RMC") of Chicago, Illinois, performed a detailed radiological survey of the Landfill under contract to the NRC. This survey was performed to determine the extent of radiological contamination. This survey indicated that the radioactive contaminants were located in two areas of the Landfill. The northern area of radioactive contamination ("Radiological Area 2") is comprised of approximately 13 acres. The radioactive debris in

this area forms a layer 2 to 15 feet thick, with radioactive debris exposed on the surface of the Landfill and along the berm on the northwest face of the Landfill. The southern area of radioactive contamination ("Radiological Area 1") is comprised of approximately 3 acres with most of the contaminated soil buried under approximately 3 feet of soil and fill.

13. The RMC survey indicated that the radioactivity emanates from uranium-238 ("U-238") and uranium-235 ("U-235") series with thorium-230 ("Th-230") and radium-226 ("Ra-226"). The survey data indicate that the average Ra-226 concentration in the radioactive wastes is approximately 90 picocuries per gram ("pCi/g"), with the average Th-230 concentration estimated to be approximately 9,000 pCi/g. Since Ra-226 has been depleted with respect to its parent Th-230, Ra-226 activity will increase in time (for example, over the next 200 years, Ra-226 activity will increase ninefold over the present level).

14. In addition to RMC's radiological survey, the NRC through Oak Ridge Associated Universities ("ORAU") contracted with the University of Missouri-Columbia Department of Civil Engineering to describe the environmental characteristics of the Site, conduct an engineering evaluation, and propose possible remedial actions for dealing with the radioactive materials at the Site. In March of 1984 a radiological survey along a section of a berm bounding the Landfill was performed by ORAU.

15. Measurements of direct radiation levels and radionuclide concentrations in soil and the physical condition of the berm area

indicated that erosion was occurring and that there were elevated concentrations of Ra-226 and Th-230 at the base of the berm and extending into the adjacent field. A sample from the mound of soil at the base of the berm contained 185 pCi/g of Ra-226 and 6,270 pCi/g of Th-230. Samples collected in the adjacent field contained 4.29-4.47 pCi/g of Ra-226 and 132-178 pCi/g of Th-230. In May 1986, ORAU sampled water wells on and close to the Landfill to determine if radioactive contamination had migrated into the groundwater. The sampling consisted of 18 monitoring wells which are located in various locations around the Landfill and are screened in the shallow, intermediate, and deep parts of the aquifer. Two sampling rounds were evaluated. Round 1 occurred from December 11-15, 1985 and Round 2 from May 19-21, 1986. All samples were analyzed for priority pollutants listed under 40 C.F.R. Part 122, Appendix D. This list includes volatile organics, acid and base/neutral extractables, pesticides, polychlorinated biphenyls ("PCBs"), total phenols, total cyanide, and metals. Four wells sampled during Round 1 were also analyzed for gross alpha and beta radiation.

16. Chemical results indicated that samples from certain wells contained detectable levels of several constituents. Chemicals found during Round 1 included methylene chloride (2-83 micrograms per liter ("ug/l"), bis-2-ethyhexyl phthalate (4-477 ug/l), phenol (7-19 ug/l), total cyanide (1-6 ug/l), sodium (5-175 milligrams per liter), iron (20-14,380 ug/l), lead (13 ug/l), and zinc (2-1,240 ug/l). Trace amounts of several pesticides also were

detected such as lindane, chlordane, dieldrin, endrin, 4,4'DDD, 4,4' DDE, 4,4' DDT, and hexachlorobenzene. The four wells sampled for gross alpha and beta radiation during Round 1 contained values for gross alpha ranging from 2-270 picocuries per liter ("pCi/l") and values for gross beta ranging from 11-171 pCi/l. Round 2 chemical results indicated the presence of methylene chloride (6-10 ug/l), bis-2-ethyhexyl phthalate (10 ug/l), total cyanide (7 ug/l), zinc (2-2,000 ug/l), and arsenic (4-9 ug/l). Compounds such as antimony, nickel, and thallium also were found.

17. In May 1986, 32 wells at the Site were sampled and analyzed for gross alpha and beta by ORAU. Isotopic analyses were performed on many of the samples to determine radium levels. The radionuclide concentrations were found to be gross alpha (0.9-8.4 pCi/l), gross beta (1.9-22 pCi/l), Ra-226 (0.2-0.7 pCi/l), Ra-228 (0.2-5.8 pCi/l), U-total (1.6-25 pCi/l), Th-228 (0.2-1.7 pCi/l), Th-230 (0.1-12 pCi/l), and Th-232 (0.2-4.0 pCi/l). The concentrations for gross alpha, Ra-226, and Ra-228 are below the permissible maximum contaminant levels for community water systems set forth in 40 C.F.R. § 141.

18. Direct contact with, and air transport of, radiological contamination would primarily affect persons working in and around the Site. Surface water runoff from the Landfill primarily flows to a drainage ditch along the north side of the Landfill and the south side of St. Charles Rock Road. This ditch may occasionally be recharged by groundwater. This surface water either recharges the groundwater or discharges through a drainage ditch to the

Missouri River. A pond along this ditch is located on the north side of the Landfill and is known to contain fish. Surface water runoff to the south and southwest flows across relatively flat agricultural fields. This runoff joins the small intermittent ditches which traverse the area. Groundwater contamination could affect persons using groundwater downgradient of the Landfill before it discharges to the Missouri River.

19. In a report entitled "Hydrogeological Investigation, West Lake Landfill, Primary Phase Report" prepared by Burns & McDonnell in October 1986, it was stated that the predominant groundwater flow direction in the alluvial aquifer in the vicinity of the Site is northwestward toward the Missouri River. The water table generally slopes toward the Missouri River, although changes in gradient direction apparently occur at some times during the year in response to changes in the stage of the Missouri River. The alluvial aquifer consists of a continuous sequence of sand deposits with some gravel zones. The alluvium at shallow depths is primarily fine to medium sand, with only traces of gravel. The alluvium in the deeper part of the aquifer is coarser grained, consisting primarily of coarse sand and gravel.

20. Uranium, thorium, radium, protactinium, and actinium are all known human carcinogens. Methylene chloride and lead are both probable human carcinogens. Phenol is a suspected carcinogen and mutagen.

21. The following pesticides were detected in analyses of groundwater samples taken at the Site: gamma BH (Lindane),

chlordane, dieldrin, endrin, 4,4' DDD, 4,4' DDE, 4,4' DDT, and hexachlorobenzene. These highly-chlorinated pesticides are probable carcinogens. They are toxic to humans via ingestion and dermal contact. Some are reproductive toxins.

22. U-238, U-235, Th-230, and Ra-226, the pesticides identified in Paragraph 21, above, methylene chloride, phenol, and lead are hazardous substances as defined in CERCLA Section 101(14), 42 U.S.C. § 9601(14).

23. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on August 30, 1990, 55 Fed. Reg. 35502.

24. Cotter Corporation (N.S.L.) is a corporation organized and existing pursuant to the laws of the State of New Mexico.

25. Laidlaw Waste Systems (Bridgeton), Inc. is a corporation organized and existing pursuant to the laws of the State of Missouri.

26. Rock Road Industries, Inc. is a corporation organized and existing pursuant to the laws of the State of Missouri.

27. The United States Department of Energy is a department of the United States Government and is a successor to the Atomic Energy Commission.

28. Cotter, by contract, agreement, or otherwise arranged for the disposal, or arranged with a transporter for transport for disposal, hazardous substances owned or possessed by it at the Site.

29. At the time of disposal of hazardous substances at the Site, West Lake Landfill, Inc. (now known as Laidlaw Waste Systems (Bridgeton), Inc., and referred to herein as Laidlaw) was an owner or operator of the Site.

30. DOE, by contract, agreement, or otherwise arranged for the disposal, or arranged with a transporter for transport for disposal, hazardous substances owned or possessed by it at the Site.

31. Rock Road is a current owner of the Site.

VI. EPA'S CONCLUSIONS OF LAW AND DETERMINATIONS

EPA makes the following Conclusions of Law and Determinations, which Respondents do not admit:

32. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

33. There has been a "release" or threat of a release of a "hazardous substance" at the Site as defined in Section 101(22) and 101(14) of CERCLA, 42 U.S.C. §§ 9601(22) and 9601(14).

34. Respondents are each a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

35. Respondents are each a responsible party pursuant to Sections 104, 107, and 122 of CERCLA, 42 U.S.C. §§ 9604, 9607, and 9622.

36. The actions required by this Consent Order are necessary to protect the public health, welfare, or environment, are practicable and in the public interest, are consistent with CERCLA and the NCP, and will expedite effective remedial action and

minimize litigation, all in accordance with Sections 104 and 122 of CERCLA, 42 U.S.C. §§ 9604 and 9622.

VII. NOTICE TO THE STATE

37. By providing a copy of this Consent Order to the State of Missouri, EPA is notifying the State of Missouri that this Consent Order is being issued and that EPA is the lead agency for coordinating, overseeing, and enforcing the activities required hereunder.

VIII. WORK TO BE PERFORMED

38. All activities performed pursuant to this Consent Order (the "Work") shall be under the direction and supervision of qualified personnel. Within thirty (30) days of the effective date of this Consent Order, and before the Work outlined below begins, Respondents shall notify EPA in writing of the names, titles, and qualifications of the principal personnel, including contractors, subcontractors, consultants, and laboratories, to be used in carrying out the Work. The qualifications of the principal persons responsible for undertaking the Work for Respondents shall be subject to EPA's review, for verification that such persons meet minimum technical background and experience requirements. This Consent Order is contingent on Respondents' demonstration to EPA's satisfaction that Respondents are qualified to perform properly and promptly the actions set forth in this Consent Order. If EPA disapproves of the technical qualifications of any person, Respondents shall notify EPA of the identity and qualifications of a replacement within thirty (30) days of receipt of EPA's

disapproval. If EPA disapproves of the replacement, EPA reserves the right to terminate this Consent Order and to conduct the Work itself, to seek reimbursement from Respondents, and/or to seek any other appropriate relief as provided herein. During the course of the performance of the Work, Respondents shall notify EPA in writing of any changes or additions in the principal personnel used to carry out the Work, including their names, titles, and qualifications. EPA shall have the same right to approve changes and additions to principal personnel as it has hereunder regarding the initial notification.

39. Respondents shall conduct activities and submit deliverables as provided by this Consent Order and the attached RI/FS Statement of Work ("SOW"), which is incorporated herein by reference, and Section IV (Statement of Purpose). All such work shall be conducted in accordance with CERCLA, the NCP, and EPA guidance including, but not limited to, the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (OSWER Directive 9355.3-01), guidances referenced therein, and guidances referenced in the SOW, as may be amended or modified by EPA. The general activities that Respondents are required to perform are identified below. The tasks that Respondents must perform are described more fully in the SOW and guidances. The activities and deliverables identified below shall be developed as provided in the RI/FS Work Plan and Sampling and Analysis Plan, and shall be submitted to EPA as provided. All work performed under this Consent Order shall be in accordance with the

schedules herein, and in full accordance with the standards, specifications, and other requirements of the RI/FS Work Plan and Sampling and Analysis Plan, as approved by EPA, and as may be amended or modified by EPA.

a. Task I - Scoping. EPA determines the Site-specific objectives of the RI/FS and devises a general management approach for the Site, as stated in the attached SOW. Respondents shall conduct the remaining scoping activities as described in the SOW and referenced guidances. At the conclusion of the project planning phase, Respondents shall submit the following deliverables to EPA:

(1) RI/FS Work Plan. Within sixty (60) days of the effective date of this Consent Order, Respondents shall submit to EPA a complete RI/FS Work Plan in accordance with the SOW. If EPA disapproves of or requires revisions to the RI/FS Work Plan, in whole or in part, Respondents (shall amend and submit to EPA a revised RI/FS Work Plan which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

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(2) Sampling and Analysis Plan. Within sixty (60) days of the effective date of this Consent Order, Respondents shall submit to EPA a ^{Draft} Sampling and Analysis Plan [in accordance with the schedule set forth in the EPA approved RI/FS Work Plan.] This Sampling and Analysis Plan shall consist of a Field Sampling Plan ("FSP") and a Quality Assurance Project Plan ("QAPP") as described in the SOW and guidances. If EPA

disapproves of or requires revisions to the Sampling and Analysis Plan, in whole or in part, Respondents shall amend and submit to EPA a revised Sampling and Analysis Plan which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

(3) Site Health and Safety Plan. Within sixty (60) days of the effective date of this Consent Order, Respondents shall submit to EPA a Site Health and Safety Plan.

b. Task II - Community Relations. EPA will prepare a Community Relations Plan, in accordance with EPA guidance and the NCP. Respondents shall provide information supporting EPA's community relations programs.

c. Task III - Site Characterization. Following EPA approval or modification of the RI/FS Work Plan and Sampling and Analysis Plan, Respondents shall implement the provisions of these Plans to characterize the Site. Respondents shall complete Site characterization in accordance with the schedule set forth in the EPA approved RI/FS Work Plan. Respondents shall provide EPA with validated analytical data generated pursuant to this Consent Order in a form showing the location, medium, and results. As used herein, "validated analytical data" refers to data that has been quality assured pursuant to the QAPP and the supporting empirical data, including instrument printouts, used to determine such quality assured data. Respondents shall require validation of all sampling results within sixty (60) days of receipt from the laboratory. This information shall be submitted to EPA with the

subsequent monthly progress report as described in Section XIII (Progress Reports), herein. Within seven (7) days of completion of field activities, Respondents shall notify EPA in writing. During Site characterization, Respondents shall provide EPA with the following deliverables, as described in the SOW and RI/FS Work Plan:

(1) Technical Memorandum on Modeling of Site Characteristics. Where Respondents propose that modeling is appropriate, Respondents shall submit a technical memorandum on modeling of Site characteristics in accordance with the schedule set forth in the approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the technical memorandum on modeling of Site characteristics, in whole or in part, Respondents shall amend and submit to EPA a revised technical memorandum on modeling of Site characteristics which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

(2) Site Characterization Summary Report. Respondents shall submit a Site Characterization Summary Report to EPA in accordance with the schedule set forth in the approved RI/FS Work Plan.

(3) Remedial Investigation Report. Within sixty (60) days of receipt from EPA of the Baseline Risk Assessment described in Section IX (EPA's Baseline Risk Assessment), Respondents shall submit to EPA a Remedial Investigation Report consistent with the SOW, RI/FS Work Plan, and Sampling

and Analysis Plan. If EPA disapproves of or requires revisions to the Remedial Investigation Report, in whole or in part, Respondents shall amend and submit to EPA a revised Remedial Investigation Report which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

d. Task IV - Treatability Studies. Respondents shall submit to EPA a memorandum analyzing whether treatability studies are needed based on the information developed during the conduct of the Remedial Investigation and the basis therefor. EPA will then determine whether Respondents shall conduct treatability studies and notify Respondents of its decision in writing. If required, major components of the treatability studies include determination of the need for and scope of studies, the design of the studies, and the completion of the studies as described in the SOW. During treatability studies, Respondents shall provide EPA with the following deliverables:

(1) Identification of Candidate Technologies Memorandum.

This memorandum shall be submitted in accordance with the schedule set forth in the EPA approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the technical memorandum identifying candidate technologies, in whole or in part, Respondents shall amend and submit to EPA a revised technical memorandum identifying candidate technologies which is responsive to all of EPA's comments within forty-five (45) days of receiving EPA's comments.

(2) Treatability Testing Work Plan. Respondents shall submit a Treatability Testing Work Plan or a proposed amendment to the RI/FS Work Plan, including a schedule, in accordance with the schedule set forth in the approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the Treatability Testing Work Plan or the proposed amendment to the RI/FS Work Plan, in whole or in part, Respondents shall amend and submit to EPA a revised Treatability Testing Work Plan or proposed amendment to the RI/FS Work Plan, which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

(3) Treatability Study Sampling and Analysis Plan. Upon the identification of the need for a separate or amended QAPP or FSP, Respondents shall submit a Treatability Study Sampling and Analysis Plan or a proposed amendment to the original QAPP or FSP, in accordance with the schedule set forth in the approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the Treatability Study Sampling and Analysis Plan or the proposed amendment to the original QAPP or FSP, in whole or in part, Respondents shall amend and submit to EPA a revised Treatability Study Sampling and Analysis Plan or proposed amendment to the original QAPP or FSP, which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments.

(4) Treatability Study Site Health and Safety Plan. Upon the identification of the need for a separate or amended

Health and Safety Plan, Respondents shall submit a Treatability Study Site Health and Safety Plan or a proposed amendment to the original Site Health and Safety Plan, in accordance with the schedule set forth in the approved RI/FS Work Plan.

(6) Treatability Study Evaluation Report. Respondents shall submit a Treatability Study Evaluation Report as provided in the SOW and RI/FS Work Plan in accordance with the schedule set forth in the approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the Treatability Study Evaluation Report, in whole or in part, Respondents shall amend and submit to EPA a revised Treatability Study Evaluation Report which is responsive to all of EPA's comments within forty-five (45) days of receiving EPA's comments.

e. Task V - Development and Screening of Remedial Alternatives. Respondents shall develop an appropriate range of waste management options that will be evaluated through the development and screening of alternatives as provided in the SOW and RI/FS Work Plan. During the development and screening of alternatives, Respondents shall provide EPA with the following deliverables:

(1) Memorandum on Remedial Action Objectives. Within sixty (60) days of receipt of the Baseline Risk Assessment, Respondents shall submit a memorandum on remedial action objectives.

(2) Report on Development and Screening of Remedial Alternatives. Respondents shall submit a report summarizing the development and screening of remedial alternatives including an alternatives array document as described in the SOW in accordance with the schedule set forth in the approved RI/FS Work Plan.

f. Task VI - Detailed Analysis of Remedial Alternatives.

Respondents shall conduct a detailed analysis of remedial alternatives as described in the SOW and RI/FS Work Plan. During the detailed analysis of alternatives, Respondents shall provide EPA with the following deliverables and presentation:

(1) Comparative Analysis Technical Memorandum and Presentation to EPA. Respondents shall submit a technical memorandum to EPA summarizing the results of the comparative analysis performed between the remedial alternatives in accordance with the schedule set forth in the approved RI/FS Work Plan. If EPA disapproves of, or requires revisions to, the comparative analysis technical memorandum, Respondents shall amend and submit to EPA a revised comparative analysis technical memorandum which is responsive to all of EPA's comments within forty-five (45) days of receiving EPA's comments. Upon EPA's request, Respondents shall make a presentation to EPA during which Respondents shall summarize the findings of the remedial investigation and remedial action objectives, and present the results of the nine criteria evaluation and comparative analysis as described in the SOW,

in accordance with the schedule set forth in the approved RI/FS Work Plan.

(2) Feasibility Study Report. Respondents shall submit a draft Feasibility Study Report which reflects the findings in the Baseline Risk Assessment in accordance with the schedule set forth in the approved RI/FS Work Plan. Respondents shall refer to Table 6-5 of the RI/FS Guidance for report content and format. If EPA disapproves of, or requires revisions to, the draft Feasibility Study Report, in whole or in part, Respondents shall amend and submit to EPA a revised Feasibility Study Report which is responsive to all of EPA's comments, within forty-five (45) days of receiving EPA's comments. The report, as amended, and the Administrative Record shall provide the basis for the Proposed Plan under CERCLA §§ 113(k) and 117(a), 42 U.S.C. §§ 6913(k) and 6917(a), by EPA and shall document the development and analysis of remedial alternatives.

40. For all deliverables, EPA will approve, disapprove, or return the deliverable to Respondents with comments or requests for modifications. In subsequent or resubmitted deliverables, Respondents shall respond to the specified deficiencies and address the information and comments from EPA. If EPA disapproves of a deliverable, EPA will state with specificity the grounds for disapproval.

41. Respondents shall not proceed further with any subsequent activities or tasks until receiving EPA approval for the following

deliverables: RI/FS Work Plan, Sampling and Analysis Plan, draft Remedial Investigation Report, Treatability Testing Work Plan, Treatability Study Sampling and Analysis Plan, and the draft Feasibility Study Report. While awaiting EPA approval on these deliverables, Respondents shall proceed with all other tasks and activities which may be conducted independently of these deliverables, in accordance with the schedule set forth in this Consent Order or the approved RI/FS Work Plan.

42. For all remaining deliverables not enumerated in the preceding Paragraph, Respondents may proceed with all subsequent tasks, activities and deliverables without awaiting EPA approval. If Respondents have not complied with an approved Work Plan or this Consent Order, or at any time EPA deems necessary to protect public health, welfare, or the environment, however, EPA reserves the right to disapprove Respondents' implementation of such tasks and may require that Respondents' cease the implementation of such tasks, either temporarily or permanently, at any point during the RI/FS.

43. In the event that Respondents amend or revise a report, plan, or other submittal upon receipt of EPA comments, if EPA subsequently disapproves of the revised submittal, or if subsequent submittals do not fully reflect EPA's directions for changes, EPA retains the right to seek stipulated or statutory penalties, perform its own studies, complete the RI/FS (or any portion of the RI/FS) pursuant to CERCLA and the NCP, and seek reimbursement from the Respondents for its costs and/or seek any other appropriate

relief. In the event EPA refuses to approve a deliverable unless Respondents change or modify it in a manner which Respondents deem inconsistent with Respondents' best professional judgment, Respondents reserve the right to seek Dispute Resolution in accordance with Section XIX (Dispute Resolutions) or pursue any other rights they may have.

44. In the event that EPA takes over some of the tasks but not the preparation of the RI/FS, Respondents shall incorporate and integrate information supplied by EPA into the final RI/FS report.

45. Neither the failure of EPA to expressly approve or disapprove of Respondents' submissions within a specified time period nor the absence of comments, shall be construed as approval by EPA. EPA will make it a goal to approve, disapprove, or comment on all deliverables within sixty (60) days of receipt of the deliverable.

IX. EPA'S BASELINE RISK ASSESSMENT

46. EPA will perform the Baseline Risk Assessment. Respondents shall support EPA in the effort by providing various information to EPA as outlined above. The major components of the Baseline Risk Assessment include contaminant identification, exposure assessment, toxicology assessment, and human health and ecological risk characterization.

47. EPA will provide, after review of Respondents' Site Characterization Summary, sufficient information concerning the baseline risks such that the Respondents can begin drafting the

Feasibility Study Report and the Memorandum on Remedial Action Objectives.

48. EPA will prepare a Baseline Risk Assessment report based on data collected by the Respondents during Site characterization. EPA will release the final report to the public at the same time it releases the final RI Report. Both reports will be put into the Administrative Record for the Site.

X. MODIFICATION OF THE RI/FS WORK PLAN

49. Respondents shall have the right to gather any additional data not specified or required under this Consent Order. If, at any time during the performance of the Work required under this Consent Order, Respondents identify a need for additional data to complete the Work which shall require a modification or extension of any part of the schedule, Respondents shall submit a memorandum to the EPA Project Coordinator explaining the need for and the nature of the requested modification or extension. If EPA does not approve or disapprove of the request for modification or extension within fourteen (14) days of receipt of the request, Respondents may proceed to gather such additional data and submit it to EPA for inclusion in the administrative record. However, any schedule modification or extension may be accomplished only in conformity with Section XXVII (Effective Date and Subsequent Modification) of this Consent Order.

50. In the event conditions posing an immediate threat to human health, welfare, or the environment become known to them, Respondents shall notify EPA and the State of Missouri no later

than twenty-four (24) hours of discovery. In the event of material unanticipated or changed circumstances at the Site, Respondents shall notify the EPA Project Coordinator by telephone within forty-eight (48) hours of discovery of such unanticipated or changed circumstances. In addition to the authorities in the NCP, in the event that EPA determines that the immediate threat or the material unanticipated or changed circumstances warrant changes in the RI/FS Work Plan, EPA may modify or amend the RI/FS Work Plan in writing accordingly. If Respondents dispute EPA's modifications or amendments to the RI/FS Work Plan, they shall submit such issue to Dispute Resolution pursuant to Section XIX. Otherwise, Respondents shall perform the RI/FS Work Plan as modified or amended.

51. EPA may determine that in addition to tasks defined in the initially approved RI/FS Work Plan, other additional work may be necessary to accomplish the objectives of the RI/FS as set forth in the SOW and the Statement of Purpose set forth in Section IV, herein. EPA may request that Respondents perform such other work in addition to the work required by the initially approved RI/FS Work Plan including any approved modifications if it determines that such actions are necessary for a complete RI/FS and is consistent with the Statement of Purpose set forth in Section IV, herein. Respondents shall confirm their willingness to perform the additional work in writing to EPA within seven (7) days of receipt of the EPA request or Respondents shall invoke Dispute Resolution. Subject to resolution of any dispute pursuant to the provisions of Section XIX (Dispute Resolution), Respondents shall implement the

additional tasks which EPA determines are necessary. The additional work shall be completed according to the standards, specifications, and schedules set forth or approved by EPA in a written modification to the RI/FS Work Plan. In the event Respondents do not agree to perform the additional work and the modification is not the subject of Dispute Resolution, EPA reserves the right to conduct the additional work itself, to seek reimbursement from Respondents, and/or to seek other appropriate relief.

XI. QUALITY ASSURANCE

52. Respondents shall assure that work performed, samples taken, and analyses conducted pursuant to this Consent Order conform to the requirements of the SOW, the QAPP, and all guidances identified herein. Respondents shall assure that field personnel used by Respondents are properly trained in the use of field equipment and in chain of custody procedures.

XII. FINAL RI/FS; PROPOSED PLAN; PUBLIC COMMENT; RECORD OF DECISION; ADMINISTRATIVE RECORD

53. EPA retains the responsibility for the release to the public of the RI/FS Reports. EPA retains responsibility for the preparation and release to the public of the Proposed Plan and ROD in accordance with CERCLA and the NCP.

54. EPA will determine the contents of the administrative record file for selection of the remedial action. Respondents will submit to EPA documents developed during the course of the RI/FS upon which selection of the response action may be based. Respondents shall provide copies of plans, task memoranda

(including documentation of field modifications, if any), recommendations for further action, quality assurance memoranda and audits, raw data, field notes, laboratory analytical reports, and other reports. To the extent not in EPA's possession at Region VII or in the possession of MDNR, Respondents must additionally submit copies of any previous studies in their possession or under their control conducted under state, local, or other federal authorities relating to selection of a response action for Radiological Areas 1 and 2, and copies of all written communications between Respondents and state, local, or other federal authorities concerning selection of a response action for Radiological Areas 1 and 2. At their discretion, Respondents may establish a community information repository at, or near, the Site to house a copy of the administrative record.

XIII. PROGRESS REPORTS

55. Respondents shall make presentations at and participate in meetings at the request of EPA during the initiation, conduct, and completion of the Work. In addition to discussion of the technical aspects of the Work, topics will include anticipated problems or new issues. Meetings will be scheduled at EPA's discretion. When practicable, EPA will give Respondents five (5) days advance written notice of any such meeting or presentation.

56. In addition to the deliverables set forth in this Consent Order, Respondents shall provide to EPA monthly progress reports by the 10th day of each following month. These progress reports shall include: (1) a description of the actions which have been taken to

comply with this Consent Order during that month; (2) all validated analytical data and all other validated data received by Respondents during that month; (3) a description of the work planned for the next two months with schedules relating such work to the overall project schedule; and (4) a description of all material problems encountered and any anticipated material problems, any actual or anticipated material delays, and solutions developed and implemented to address any actual or anticipated material problems or delays.

XIV. SAMPLING AND DATA ANALYSIS

57. All validated analytical data, including results of sampling, tests, modeling, or other data generated by Respondents or on Respondents' behalf, pursuant to the requirements of this Consent Order shall be submitted to EPA in the subsequent monthly progress report as described in Section XIII (Progress Reports) of this Consent Order. EPA will make available to Respondents validated data generated by EPA unless it is exempt from disclosure by any federal or state law or regulation.

58. Respondents orally will notify EPA at least fourteen (14) days prior to conducting significant field events as described in the SOW, RI/FS Work Plan, or Sampling and Analysis Plan. Upon EPA's request, Respondents shall allow EPA or its authorized representatives to take a reasonable number of split or duplicate samples of samples collected by Respondents in implementing this Consent Order.

59. Respondents may assert a business confidentiality claim covering part or all of the information submitted to EPA pursuant to the terms of this Consent Order to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9607(e)(7), and 40 C.F.R. § 2.203(b). This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public without further notice to Respondents. Respondents agree not to assert confidentiality claims with respect to any data related to Site conditions, sampling, or monitoring.

60. By entering into this Consent Order, Respondents waive any objections to the validity of any data gathered, generated, or evaluated by EPA, the State of Missouri, or Respondents in the performance or oversight of the Work that has been verified according to the approved quality assurance/quality control ("QA/QC") procedures required by the Consent Order. If Respondents object to data relating to the Work, Respondents shall submit to EPA a report that identifies and explains its objections, describes the acceptable uses of the data, if any, and identifies any limitations to the use of the data. Such report must be submitted to EPA within fifteen (15) days of the monthly progress report containing the data.

61. To the extent practicable, EPA orally will notify Respondents at least five (5) days prior to conducting any independent field activities relating to the Site during the course of the performance of the Work. At Respondents' oral or written request, EPA will permit Respondents' representative to be present during any such activities and shall allow split or duplicate samples to be taken by Respondents of any samples collected by EPA relating to the Site. All samples taken by EPA will be taken, handled, and analyzed in accordance with the procedures specified in the FSP, to the extent applicable, and the QAPP. EPA will assure that field personnel used by EPA are properly trained in the use of field equipment, in chain of custody procedures, and as required by the Health and Safety Plan.

XV. ACCESS

62. Commencing upon the effective date of this Consent Order, Respondents agree to provide EPA and its representatives, including its contractors, access at all times to the Site and any other property to which access is required for the implementation of this Consent Order, to the extent access to the property is controlled by Respondents, for the purposes of conducting any activity related to this Consent Order including, but not limited to:

- a. Monitoring the Work;
- b. Verifying any data or information submitted to EPA;
- c. Conducting investigations relating to contamination at or near the Site;
- d. Obtaining samples;

- e. Assessing the need for, planning, or implementing additional response actions at or near the Site;
- f. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondents or their agents; and
- g. Assessing Respondents' compliance with this Consent Order.

63. Prior to entering the Site, EPA will provide, when practicable, Respondents' Project Coordinator with the credentials or other written notice of all EPA personnel and representatives authorized to enter the Site pursuant to this Section.

64. EPA and its representatives shall comply with the Site Health and Safety Plan while on Site.

65. To the extent that the Site or any other property to which access is required for the implementation of this Consent Order is owned or controlled by persons other than Respondents, Respondents shall use best efforts to secure from such persons access for Respondents, as well as for EPA and its representatives, including, but not limited to, its contractors, as necessary to effectuate this Consent Order. If any access required to complete the Work is not obtained within thirty (30) days of the effective date of this Consent Order, or within thirty (30) days of the date EPA notifies Respondents in writing that additional access beyond that previously secured is necessary, Respondents shall promptly notify EPA, and shall include in that notification a summary of the steps Respondents have taken to attempt to obtain access. EPA may, as it deems appropriate, assist Respondents in obtaining access.

Respondents shall reimburse EPA, in accordance with the procedures in Section XXII (Reimbursement of Response and Oversight Costs), for all costs incurred by EPA in obtaining access.

66. Notwithstanding any provision of this Consent Order, EPA retains all of its access authorities and rights, including enforcement authorities related thereto, under CERCLA, the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901-6992k, and any other applicable statutes or regulations.

XVI. PROJECT COORDINATORS

67. All documents and correspondence which must be submitted pursuant to this Consent Order shall be sent by certified mail, return receipt requested, by overnight delivery service, or hand-delivered to the following addressees or to any other addressees which Respondents and EPA designate in writing:

a. Documents to be submitted to EPA shall be sent in triplicate to:

Diana L. Newman
U.S. Environmental Protection Agency
Region VII
WSTM/SAFE
726 Minnesota Avenue
Kansas City, Kansas 66101

b. Documents to be submitted to Respondents should be sent to:

Jerome T. Wolf
Michael D. Hockley
Spencer Fane Britt & Browne
1400 Commerce Bank Building
1000 Walnut Street
Kansas City, Missouri 64106

with cc by mail to:

James F. Gunn
Sandra L. Oberkfell
The Stolar Partnership
911 Washington Avenue
St. Louis, Missouri 63101

Charlotte Neitzel
Holme Roberts & Owen
1700 Lincoln, Suite 4100
Denver, Colorado 80203

James W. Wagoner II
Director, Division of Offsite Programs
Office of Eastern Area Programs
Office of Environmental Restoration
U.S. Department of Energy
12800 Middlebrook Road
Germantown, Maryland 20874

Unless otherwise specified, any notices or submissions required by this Consent Order shall be deemed delivered on the date placed in the United States Mail, delivered to an overnight service, or hand-delivered. If response deadlines are triggered by receipt of a notice, then such notice, for purposes of calculating the affected deadline, shall be deemed received upon actual receipt.

68. On or before the effective date of this Consent Order, EPA and Respondents shall each designate their own Project Coordinator. Each Project Coordinator shall be responsible for overseeing the implementation of this Consent Order. To the maximum extent possible, communications between Respondents and EPA shall be directed between the Project Coordinators as specified in Section XVI (Project Coordinators), herein, by mail with copies to such other persons as EPA and Respondents may respectively designate. Communications include, but are not limited to, all

documents, reports, approvals, and other correspondence submitted under this Consent Order.

69. EPA and Respondents each have the right to change their respective Project Coordinator. The other party must be notified in writing at least ten (10) days prior to any such change.

70. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and On-Scene Coordinator ("OSC") by the NCP. In addition, EPA's Project Coordinator shall have authority consistent with the NCP to halt any work required by this Consent Order and to take any necessary response action when EPA determines that conditions at the Site may present an immediate endangerment to public health or welfare or the environment. The absence of the EPA Project Coordinator from the Site shall not be cause for the stoppage or delay of work.

XVII. OTHER APPLICABLE LAWS

71. Respondents shall comply with all applicable laws when performing the activities pursuant to this Consent Order. No federal, state, or local permits are required for on-Site response actions conducted pursuant to CERCLA Sections 104, 121, or 122. The term "on-Site" means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of activities pursuant to this Consent Order.

XVIII. RECORD PRESERVATION

72. One complete set of all records and documents in Respondents' possession that relate to this Consent Order shall be

preserved during the conduct of this Consent Order and for a minimum of six (6) years after commencement of construction of any remedial action. Respondents shall acquire and retain one complete copy of all non-privileged documents that relate to this Consent Order that are in the possession of their employees, agents, accountants, contractors, or attorneys. At the conclusion of this six (6) year period, Respondents shall notify EPA at least ninety (90) days prior to the destruction of any such records or documents, and, upon EPA's request, Respondents shall deliver any such records or documents to EPA.

XIX. DISPUTE RESOLUTION

73. The provisions of this Dispute Resolution section apply to all deliverables required by the Consent Order and all matters for which Dispute Resolution has been expressly provided. Any disputes concerning activities or deliverables required under this Consent Order for which Dispute Resolution is applicable shall be resolved as follows: If Respondents object to any EPA notice of disapproval or requirement made pursuant to this Consent Order, Respondents shall notify EPA's Project Coordinator in writing of their objections within fourteen (14) days of receipt of the disapproval notice or requirement. Respondents' written objections shall define the dispute, state the basis of Respondents' objections, and be sent certified mail, return receipt requested. EPA will, within fourteen (14) days of receipt of Respondents' objections, respond to Respondents in writing, specifically addressing the points raised by Respondents and identifying points

of agreement and disagreement. EPA and Respondents then have an additional fourteen (14) days to reach agreement.

74. If agreement is not reached within the fourteen (14) day period referenced above, Respondents and EPA will communicate their respective position in writing to the Division Director of EPA Region VII's Waste Management Division, who shall resolve the dispute and provide a written statement of his decision to Respondent. The Division Director's determination is EPA's final decision. Respondents shall proceed in accordance with EPA's final decision regarding the matter in dispute regardless of whether Respondents agree with the decision. If the Respondents do not agree to perform, or do not perform the work in accordance with EPA's final decision, EPA reserves the right in its sole discretion to conduct the work itself, to seek reimbursement from the Respondents, to seek enforcement of the decision, to seek stipulated penalties, and/or to seek any other appropriate relief. No action, decision, or directive made by EPA, including without limitation the Division Director of EPA Region VII's Waste Management Division pursuant to this Consent Order shall constitute a final agency action giving rise to any rights to judicial review prior to EPA's initiation of judicial action to compel Respondents' compliance with this Consent Order. Respondents reserve any rights that they may have to seek any appropriate relief to the extent available by applicable law.

75. Respondents are not relieved of their obligations to perform and conduct activities and submit deliverables on the

schedule set forth in the RI/FS Work Plan while a matter is pending in Dispute Resolution. The invocation of Dispute Resolution does not stay stipulated penalties under this Consent Order. If, however, Respondents prevail in the dispute, deadlines directly affected by the matters in dispute shall be extended for a period of time equal to the time taken to resolve the dispute under the procedures of this Section, plus reasonable time for remobilization, as determined by EPA.

XX. DELAY IN PERFORMANCE/STIPULATED PENALTIES

76. Respondents (excluding DOE) shall be liable for stipulated penalties in the amounts set forth in Paragraphs 77 and 78 to the EPA for failure to comply with the requirements of this Consent Order specified below, unless excused pursuant to Section XXI (Force Majeure). In the event that EPA determines that DOE has failed to comply with any provision which would otherwise give rise to stipulated penalties, DOE understands that this Consent Order, as it applies to DOE, will be deemed null and void, and the rights and protections afforded DOE under the Consent Order will be terminated. "Compliance" by Respondents shall include completion of the activities under this Consent Order or any work plan or other plan approved under this Consent Order identified below in accordance with all applicable requirements of law, this Consent Order, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Order and within the specified time schedules established by and approved under this Consent Order.

77. If Respondents do not submit the deliverable items listed below by the deadlines stated in the SOW, or do not perform the tasks listed below in accordance with the schedules listed in the RI/FS Work Plan, the following stipulated penalties shall be payable per day by Respondents:

<u>Penalty Per Violation</u> <u>Per Day</u>	<u>Period of Noncompliance</u>
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\$ 500	1st through 7th day
\$ 1,000	8th through 30th day
\$ 2,500	31st day and beyond.

The penalties in this Paragraph shall apply to the following deliverable items:

- a. The draft and any revised work plan.
- b. The draft and any revised sampling and analysis plan.
- c. The draft and any revised Remedial Investigation Report.
- d. The draft and any revised Feasibility Study Report.

78. If Respondents do not submit the deliverable items listed below by the deadlines stated in the RI/FS Work Plan, or do not perform the tasks listed below in accordance with the schedules listed in the RI/FS Work Plan, the following stipulated penalties shall be payable per day by Respondents:

<u>Penalty Per Violation</u> <u>Per Day</u>	<u>Period of Noncompliance</u>
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\$ 250.00	1st through 7th day
\$ 500.00	8th through 30th day
\$ 1,000.00	31st day and beyond.

The penalties in this Paragraph shall apply to the following deliverable items as well as any other deliverables not specifically listed in this Section:

- a. Site Health and Safety Plan.
- b. Technical memorandum on modeling of Site characteristics.
- c. Site Characterization Summary.
- d. Evaluation of Need for Treatability Studies technical memorandum.
- e. Treatability Study Site Health and Safety Plan.
- f. Treatability Study Evaluation Report.
- g. Technical memorandum entitled Refined Remedial Action Objectives.
- h. Report entitled Development and Screening of Remedial Alternatives.
- i. Comparative analysis technical memorandum.
- j. Monthly progress reports.

79. Except as otherwise provided herein, all penalties shall begin to accrue on the day after complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Order. For violations not based on timeliness, stipulated penalties shall not begin to accrue until after Respondents have had the opportunity to revise the submission to respond to EPA's written comments. If any revised submission fails to respond to

EPA's comments and/or remedy the specified deficiencies and EPA deems such failure to constitute a violation, then EPA will provide Respondents with written notice of such violation. In such case, the stipulated penalties shall accrue from the date of receipt of such notice by Respondents.

80. Following EPA's determination that Respondents have failed to comply with a requirement of this Consent Order, EPA will provide Respondents with written notification of same and describe the noncompliance. This notice also will indicate the amount of penalties due and whether the penalties continue to accrue. Except for violations not based on timeliness, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified the Respondents of a violation.

81. All penalties owed to the EPA under this Section shall be due and payable within thirty (30) days of the Respondents' receipt from EPA of a notification of noncompliance, unless Respondents invoke the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) of this Consent Order. Respondents shall pay interest on the unpaid balance, which shall begin to accrue at the end of the thirty (30) day period at the rate established by the Department of Treasury pursuant to 31 U.S.C. § 3717 and 4 C.F.R. § 102.13. Respondents shall further pay a handling charge of one percent (1%), to be assessed at the end of each thirty-day period, and a six percent (6%) per annum penalty charge, to be assessed if the penalty is not paid in full within ninety (90) days after it is due. All payments under this Section shall be paid by certified

check made payable to "EPA Hazardous Substance Superfund," shall be mailed to:

Mellon Bank
Attn: Superfund Accounting
EPA Region VII
(Comptroller Branch)
Post Office Box 360748M
Pittsburgh, PA 15251

82. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to EPA's Project Coordinator as set forth in Section XVI (Project Coordinators) of this Consent Order.

83. Neither the filing of a request to resolve a dispute nor the payment of penalties shall alter in any way Respondents' obligation to complete the performance required hereunder.

84. Respondents may dispute the applicability of stipulated penalties and EPA's right to the stated amount of penalties by invoking the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) of this Consent Order. Penalties shall accrue but need not be paid during the Dispute Resolution period.

85. If Respondents fail to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as late charges and interest. Respondents shall pay interest on the unpaid balance, which shall begin to accrue at the end of the forty-five day period at the rate established pursuant to 31 U.S.C. § 3717 and 4 C.F.R. § 102.13. The stipulated penalties provisions do not prohibit, alter, or in any way limit EPA's ability to seek any other remedies or sanctions available by virtue of Respondents' violation of this Consent Order or of the statutes and regulations

upon which it is based. Provided, however, EPA will be precluded from seeking other judicial or administrative penalties for those violations specified in this Section unless Respondents fail to pay penalties assessed pursuant to this Section.

XXI. FORCE MAJEURE

86. Respondents shall perform the requirements of this Consent Order within the time limits set forth herein, unless the performance is prevented or delayed by events which constitute a force majeure or excusable delay. A force majeure or excusable delay is defined as any event arising from causes not foreseeable and beyond the reasonable control of Respondents, including its consultants and contractors, which could not be overcome by Respondents' best efforts and which delays or prevents performance by a date required by this Consent Order. Such events do not include unanticipated or increased costs of performance or changed economic circumstances. To the extent Respondents (excluding DOE pursuant to Paragraph 76 herein) are subject to stipulated penalties as a result of a delay caused by an act or omission of DOE, EPA, at its discretion, may consider such delay excusable for the purposes of assessment of stipulated penalties.

87. Respondents shall notify EPA orally within forty-eight (48) hours of when they first knew or should have known that a delay might occur. Within ten (10) business days thereafter, Respondents shall submit to EPA a written statement setting forth the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay;

a schedule for implementation of any measures to be taken to mitigate the effect of the delay; and a statement as to whether, in the opinion of Respondents, such event may cause or contribute to an endangerment to public health, welfare, or the environment. Respondents shall adopt all reasonable measures to avoid and minimize the delay. Failure to comply with the notice provision of this Section shall constitute a waiver of Respondent's right to assert a force majeure or that the delay is excusable.

88. If EPA determines that the delay has been or will be caused by force majeure or that the delay is otherwise excusable, the time for performance for that element of work, and other tasks the completion of which is dependent upon that element of work, may be extended, upon EPA approval, for a period of equal to the delay resulting from such circumstances. All such modifications of the schedule caused by a force majeure or excusable delay shall be made in accordance with Section XXVII (Effective Date and Subsequent Modification) of this Consent Order. The schedule for those tasks which are not altered by these modifications remains unchanged unless altered in accordance with Section XXVII (Effective Date and Subsequent Modification). In the event EPA and Respondents cannot agree that any delay or failure has been or will be caused by a force majeure or that the delay is otherwise excusable, or if there is no agreement on the length of the extension, this dispute shall be resolved in accordance with the Dispute Resolution provisions of Section XIX (Dispute Resolution) of this Consent Order.

XXII. REIMBURSEMENT OF RESPONSE AND OVERSIGHT COSTS

89. Following the effective date of this Consent Order, EPA periodically will submit to the Respondents an accounting of all response costs including oversight costs incurred by EPA with respect to this Consent Order. Response costs may include, but are not limited to, costs incurred by EPA in overseeing Respondents' implementation of the requirements of this Consent Order and activities performed by EPA relating to the Consent Order and any costs incurred while assisting Respondents in obtaining access. Costs shall include all direct and indirect costs including, but not limited to, time and travel costs of EPA personnel and associated indirect costs, contractor costs, cooperative agreement costs, compliance monitoring, including the collection and analysis of split samples, inspection of activities required by this Consent Order, Site visits, discussions regarding disputes that may arise as a result of this Consent Order, review and approval or disapproval of reports, and costs of redoing any of Respondents' tasks. Any necessary summaries including, but not limited to, EPA's certified Agency Financial Management System summary data ("SPUR Reports"), or such other summary as certified by EPA, shall serve as a basis for payment demands.

90. Respondents (excluding DOE) shall, within sixty (60) days of receipt of each accounting, remit a certified or cashier's check for the amount of those costs. Interest shall accrue from the later of the date payment of a specified amount demanded in writing is due, or the date of the expenditure. The interest rate is the

rate of interest on investments for the Hazardous Substances Superfund in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

91. All payments to EPA under this Section shall be made by certified or cashier's check made payable to "EPA Hazardous Substance Superfund" and shall include the Site name, the EPA Site identification number 514, and the EPA Docket Number assigned to this matter, and shall be remitted to:

Mellon Bank
Attn: Superfund Accounting
EPA Region VII
(Comptroller Branch)
Post Office Box 360748M
Pittsburgh, PA 15251

92. A copy of the check shall be sent simultaneously to the EPA Project Coordinator.

93. Respondents agree to limit any disputes concerning costs to accounting errors, the inclusion of costs outside the scope of this Consent Order, or costs that are inconsistent with the NCP. Respondents shall identify any contested costs and the basis of their objection. All undisputed costs shall be remitted in accordance with the time frame set forth above. Disputed costs shall be paid into an escrow account while the dispute is pending. Respondents bear the burden of establishing an EPA accounting error, the inclusion of costs outside the scope of this Consent Order, or costs inconsistent with the NCP.

XXIII. RESERVATION OF RIGHTS

94. Any requirement for the payment or obligation of funds by DOE established by the terms of this Consent Order shall be subject to the availability of funds appropriated for that purpose, and no

provision herein shall be interpreted to require the obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341.

95. EPA reserves the right to bring an action against the Respondents pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, for the recovery of all response costs including oversight costs incurred by EPA at the Site that are not reimbursed by the Respondents, any costs incurred in the event that EPA performs the RI/FS or any part thereof, and any future costs incurred by EPA in connection with response activities conducted under CERCLA at the Site. Respondents reserve all rights they may have to oppose and defend against such claims and actions and to assert any and all claims they may have against EPA or any person or government agency.

96. EPA reserves the right to bring an action against Respondents to enforce the requirements of this Consent Order, and to seek penalties and punitive damages pursuant to CERCLA.

97. Except as expressly provided in this Consent Order, each party reserves all rights and defenses it may have. Nothing in this Consent Order shall affect EPA's removal authority or EPA's response or enforcement authorities including, but not limited to, the right to seek injunctive relief, statutory penalties, and/or punitive damages. To the extent stipulated penalties apply to violations of a particular requirement of this Consent Order, however, EPA will not seek statutory penalties for such violations unless Respondents fail or refuse to pay stipulated penalties

assessed for such a violation. Respondents reserve any and all rights they may have to oppose and defend against such claims and actions and to assert any and all claims they may have against EPA or any person or government agency. Respondents reserve any rights they may have to bring any action otherwise available against any "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

98. Following satisfaction of the requirements of this Consent Order, Respondents shall have resolved their liability to EPA for the work performed by Respondents pursuant to this Consent Order. Respondents are not released from liability, if any, for any response actions taken beyond the scope of this Consent Order regarding removals or activities arising pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9612(c).

XXIV. DISCLAIMER

99. By signing this Consent Order and taking actions under this Consent Order, Respondents do not admit EPA's Findings of Fact and Conclusions of Law. Furthermore, the participation of Respondents in this Consent Order shall not be considered an admission of liability and is not admissible in evidence against Respondents in any judicial or administrative proceeding other than a proceeding by the United States on behalf of EPA to enforce this Consent Order or a judgment relating to it. Each Respondent retains its rights to assert claims against the other Respondents and other potentially responsible parties at the Site. Respondents agree, however, not to contest the validity or terms of this

Consent Order or the procedures underlying or relating to it in any action brought by the United States on behalf of EPA to enforce its terms.

XXV. OTHER CLAIMS

100. In entering into this Consent Order, Respondents waive any right to seek reimbursement pursuant to Section 106(b) of CERCLA, 42 U.S.C. § 9606(b). Respondents also waive any right to present a claim under Section 111 or 112 of CERCLA, 42 U.S.C. §§ 9611 and 9612. This Consent Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2). Injuries or damages resulting from acts or omissions of the EPA, its agents, employees or other persons acting on its behalf on property owned or operated by Respondents shall be subject to the procedures of the Federal Tort Claims Act of 1949, as amended, 28 U.S.C. § 2671, et seq. (FTCA). Except for claims subject to the procedures of the FTCA, Respondents waive all other statutory and common law claims against EPA relating to or arising out of conduct of the RI/FS under this Consent Order.

101. Nothing in this Consent Order shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any party not a signatory to this Consent Order for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, releases or disposal of any hazardous substances, pollutants, or contaminants found at, taken to, or taken from the Site.

102. Respondents shall each bear their own costs and attorneys fees.

XXVI. FINANCIAL ASSURANCE AND INDEMNIFICATION

103. Within thirty (30) days of the effective date of this Consent Order, Respondents (excluding DOE) shall obtain an Irrevocable Letter of Credit in the amount of \$1,050,000, naming EPA as the Beneficiary, and provide a copy of such letter to EPA within forty-five (45) days of the effective date of this Consent Order.

104. Respondents (excluding DOE) agree to indemnify and hold the EPA, its agents, and its employees harmless from any and all claims or causes of action arising from or on account of acts or omissions of Respondents, its employees, agents, servants, receivers, successors, or assignees, or any persons including, but not limited to, firms, corporations, subsidiaries and contractors in carrying out activities under this Consent Order. Except for contracts entered into by DOE, the United States Government or any agency or authorized representative thereof shall not be held as a party to any contract entered into by Respondents in carrying out activities under this Consent Order. Respondents shall be under no duty, however, to indemnify the EPA for claims or causes of action arising from or on account of negligent, willful, or intentional acts or omissions of the EPA, its officers, agents, employees or any other person acting on its behalf. Nothing herein is intended to or shall be construed as extending the liability of the EPA beyond that provided for under federal law.

XXVII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

105. The effective date of this Consent Order shall be the date that it is signed by EPA.

106. This Consent Order may be amended by mutual agreement of EPA and Respondents. Amendments shall be in writing and shall be effective when signed by EPA.

107. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules and any other writing submitted by the Respondents will be construed as relieving the Respondents of its obligation to obtain such formal approval as may be required by this Consent Order. Any deliverables, plans, technical memoranda, reports (other than progress reports), specifications, schedules and attachments required by this Consent Order are, upon approval by EPA, incorporated into this Consent Order.

XXVIII. TERMINATION AND SATISFACTION

108. This Consent Order shall terminate when Respondents demonstrate in writing and certify to the satisfaction of EPA that all activities required under this Consent Order including any additional work, payment of response and oversight costs, and any stipulated penalties demanded by EPA have been performed and EPA has approved the certification. EPA will make it a goal to notify Respondents within sixty (60) days of receipt of such certification whether it has approved or disapproved the certification. In the event EPA disapproves the certification, it will specify in writing the reasons therefore. If EPA disapproves the certification or

fails to respond to the certification within sixty (60) days, Respondents may invoke the provisions of Section XIX (Dispute Resolution). This notice shall not, however, terminate Respondents' obligation to comply with Sections XVII (Other Applicable Laws), XVIII (Record Preservation), XXII (Reimbursement of Response and Oversight Costs), and XXIII (Reservation of Rights) of this Consent Order.

109. The certification shall be signed by a responsible official representing each Respondent. Each representative shall make the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate, and complete." For purposes of this Consent Order, a responsible official is a corporate official who is in charge of a principal business function.

FOR RESPONDENTS:

COTTER CORPORATION (N.S.L.),
a New Mexico corporation

Rich D. Fry

Exec. Vice-President

LAIDLAW WASTE SYSTEMS (BRIDGETON), INC.,
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Miles H. Stotts

MILES H. STOTTS

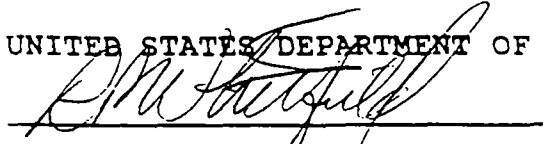
REGIONAL ENVIRONMENTAL MANAGER

ROCK ROAD INDUSTRIES, INC.,
a Missouri corporation



W.E. WHITAKER - PRESIDENT

UNITED STATES DEPARTMENT OF ENERGY



Deputy Assistant Secretary for
Environmental Restoration

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY:

3-2-93
Date

David A. Hoefler
David A. Hoefler
Assistant Regional Counsel
U.S. Environmental Protection Agency

3/3/93
Date

David M. Wagener
David Wagener, Director
Waste Management Division
U.S. Environmental Protection Agency

**REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STATEMENT OF WORK
WEST LAKE LANDFILL**

December 29, 1992

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STATEMENT OF WORK
WEST LAKE LANDFILL

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**REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STATEMENT OF WORK
WEST LAKE LANDFILL**

1.0 INTRODUCTION

This document is the Statement of Work ("SOW") incorporated by reference in the United States Environmental Protection Agency ("EPA") - West Lake Landfill Administrative Order on Consent for Remedial Investigation/Feasibility Study ("AOC") EPA (Docket No. VII-93-F-0005) for the conduct of a Remedial Investigation/Feasibility Study ("RI/FS") of Radiological Areas 1 and 2 at the West Lake Landfill, National Priorities List ("NPL") site in Bridgeton, Missouri. The purpose of the RI/FS is to investigate the nature and extent of contamination, assess the potential risk to human health and the environment presented by such contamination, and develop and evaluate potential remedial alternatives at the Site. The definition of "Site" as used herein, shall refer to Radiological Areas 1 and 2, including areas where contaminants have migrated consistent with Section IV (Statement and Purpose) of the AOC. The terms contamination, contaminant(s), waste, etc., are defined herein as radiological and other hazardous substances. The RI and FS are interactive and may be conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies, as needed.

Respondents shall conduct this RI/FS (except for the Baseline Risk Assessment component) and shall produce a draft RI and FS report that are in accordance with this SOW, the Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, October 1988), and any other guidance that EPA uses in conducting a RI/FS, as well as any additional requirements in the AOC. A list of primary guidance is presented in Section 9.0. The RI/FS Guidance describes the report format and the required report content. Respondents shall furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the Consent Order.

Upon the completion of the RI/FS, EPA will be responsible for the selection of a Site remedy and will document this selection in a Record of Decision ("ROD"). The remedial action alternative selected by EPA will meet the cleanup standards specified in Section 121 of CERCLA, 42 U.S.C. § 9621. That is, the selected remedial action will be protective of human health and the environment, will be in compliance with, or include a waiver of,

applicable or relevant and appropriate requirements of other laws, will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element. The final RI/FS report, as adopted by EPA, and EPA's Baseline Risk Assessment will, with the administrative record, form the basis for the selection of the Site's remedy and will provide the information necessary to support the development of the ROD.

As specified in Section 104(a)(I) of CERCLA, 42 U.S.C. § 9604(a)(I), EPA will provide oversight of Respondents' activities throughout the RI/FS. Respondents will support EPA's initiation and conduct of activities related to the implementation of oversight activities.

2.0 TASK I - SCOPING

Scoping is the initial planning process of the RI/FS and is initiated by EPA prior to issuing special notice. During scoping, the Site-specific objectives of the RI/FS are determined by EPA. Respondents will document the specific project scope in a work plan. Because the work required to perform a RI/FS is not fully known at the onset, it may be phased in accordance with a site's complexity and the amount of available information. The number of phases and precise activities contained in each phase will be determined during Project Scoping and described in detail in the RI Work Plan. At present the following phases are envisioned.

1. Phase I: This phase will consist of the implementation of Tasks I through VI. These tasks are discussed in detail in the following subsections
2. Phase II: Based on the results of Phase I, Phase II activities may consist of: performing additional RI activities as needed to refine the Site conceptual models or respond to emergent issues; implementing treatability studies, as needed; and refining the FS, as needed. The exact nature or need of these activities is not known at this time.

The phases may overlap depending upon the nature and amount of interaction between the RI and FS activities. It may be necessary to modify the RI/FS Work Plan during the RI/FS to satisfy the objectives of the study.

When scoping the specific aspects of a project, Respondents shall meet with EPA to discuss project planning decisions and special concerns associated with the Site. The following activities shall be performed by Respondents as a function of the project planning process.

2.1 Site Background

Respondents shall gather and analyze Site background information and shall conduct a Site visit to assist in planning the scope of the RI/FS.

2.1.1 Collect And Analyze Existing Data And Document The Need For Additional Data

Before planning RI/FS activities, all Site data shall be compiled and reviewed by Respondents. Specifically, this will

include presently available data relating to the varieties and quantities of hazardous substances at the Site, and past disposal practices. This shall also include results from any previous chemical sampling events and hydraulic monitoring that have been conducted. This information will be utilized in determining additional data needed to characterize the Site, better defining potential applicable or relevant and appropriate requirements ("ARARs"), and developing a range of preliminary identified remedial alternatives. Data Quality Objectives ("DQOs") shall be established, subject to EPA approval, specifying the usefulness of existing data. Decisions on data necessary for performance of the Baseline Risk Assessment and DQOs will be made by EPA with consideration of comments by Respondents.

Respondents shall obtain aerial photographs of the Site to help characterize drainage and surficial soils in the vicinity of the landfill and to evaluate berm construction and waste disposal practices conducted at the landfill.

2.1.2 Site Visit

Respondents shall conduct a Site visit during the project scoping phase to assist in developing a conceptual site model of the physical and chemical framework for the Site, sources and areas of contamination, as well as potential exposure pathways and receptors at the Site. During the Site visit Respondents should observe the Site's physiography, hydrology, geology, and demographics, as well as natural resource, ecological, and cultural features. This information will be utilized to better scope the project and to determine the extent of additional data necessary to characterize the Site, better define potential ARARs, and narrow the range of preliminarily identified remedial alternatives.

2.2 Project Planning

Once Respondents have collected and analyzed existing data and conducted a Site visit, the specific project scope shall be planned. Project planning activities include those tasks described below as well as identifying data needs, developing a work plan, designing a data collection program, and identifying health and safety protocols. Respondents shall meet with EPA regarding the following activities and before the drafting of the scoping deliverables referenced in the following sections.

2.2.1 Develop A Conceptual Site Model

Information on the physical and chemical framework for the Site, potential waste sources, potential contaminant migration and exposure pathways, and receptors at the Site shall be used to develop and be included in a conceptual site model of the Site and to evaluate potential risks to human health and the environment. The conceptual site model will provide the basis for selecting sampling locations and the identification of potential remedial technologies.

The characteristics of landfill design, landfill expansions, waste disposal activities, engineering control systems, leachate monitoring, leachate collection, gas collection, berm construction, soil capping, and refuse thickness will be reviewed, as appropriate, evaluated as part of the scoping process, and utilized in the preparation of the Conceptual Site Model during scoping meetings and documented in the meeting minutes.

2.2.2 Refine And Document Preliminary Remedial Action Objectives And Alternatives

Once existing Site information has been analyzed and an understanding of the potential Site risks has been developed, Respondents must identify potential remedial action objectives for each contaminated medium and a preliminary range of remedial action alternatives and associated technologies. The preliminary remedial action objectives and associated technologies along with the conceptual site model will be presented in scoping meeting minutes, with EPA participation.

2.2.3 Document The Need For Treatability Studies

If remedial actions involving treatment have been identified by Respondents or EPA, treatability studies will be required except where Respondents can demonstrate to EPA's satisfaction that they are not needed, as discussed in the AOC.

2.2.4 Begin Preliminary Identification of Potential ARARs

Respondents shall conduct a preliminary identification of potential state and federal ARARs (chemical-specific, location-specific, and action-specific) to assist in the

refinement of remedial action objectives, and the initial identification of remedial alternatives and ARARs associated with particular actions. ARAR identification will continue as Site conditions, contaminants, and remedial action alternatives are better defined.

2.3 Scoping Deliverables

At the conclusion of the project planning phase, Respondents must submit the scoping meeting minutes identifying the preliminary remedial action objectives and presenting the Conceptual Site Model, a RI/FS Work Plan, a Sampling and Analysis Plan, and a Site Health and Safety Plan to EPA. The RI/FS Work Plan and Sampling and Analysis Plan must be reviewed and approved by EPA prior to the initiation of field activities.

2.3.1 RI/FS Work Plan

A work plan entitled RI/FS Work Plan, documenting the decisions and evaluations completed during the scoping process, will be submitted to EPA for review and approval. The RI/FS Work Plan will be developed in conjunction with the Sampling and Analysis Plan and a Health and Safety Plan. The RI/FS Work Plan will include a comprehensive description of the work to be performed, including the methodologies to be utilized, as well as a corresponding schedule for completion. In addition, the RI/FS Work Plan will include the rationale for performing the activities. The RI/FS Work Plan shall recognize EPA's preparation of the baseline risk assessment.

Specifically, the RI/FS Work Plan will state the objectives of the RI/FS. It will include a background summary setting forth a description of the Site including the geographic location and site management; to the extent possible, a description of physiography, hydrology, geology, demographics, ecological, cultural and natural resource features; a synopsis of the history and a description of previous activities that have been conducted by local, state, Federal, or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media in the vicinity of the Site.

In addition, the RI/FS Work Plan will include a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. It will include a process for and manner of identifying Federal and

state ARARs (chemical-specific, location-specific, and action-specific). The RI/FS Work Plan will present a detailed description of the tasks to be performed; information needed from each task; and a description of the work products that will be submitted to EPA, as set forth in the remainder of this SOW; schedule; project management plan; data management plan; monthly reports; meetings; and presentations.

Because of the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. If any additional data requirements are identified, the Respondents will inform and propose the additional data requirements in a technical memorandum to EPA for review and approval. Respondents are responsible for fulfilling additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS.

2.3.2 Sampling and Analysis Plan

A plan entitled Sampling and Analysis Plan ("SAP") will be submitted to EPA for review and approval. It will set forth plans and procedures to be followed during implementation of the RI/FS. Sampling and analysis will be conducted in accordance with technically acceptable protocols that meet DQOs. The SAP consists of a Field Sampling Plan ("FSP") and a Quality Assurance Project Plan ("QAPP").

The FSP will define in detail the sampling and data-gathering methods that will be used on the project. It will include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control ("QA/QC") protocols that will be used to achieve the desired DQOs. In addition, the QAPP will address sampling procedures, sample custody, analytical procedures, and data reduction, validation, reporting and personnel qualifications. The Respondents will demonstrate, in advance, to EPA's satisfaction, that each laboratory it uses is qualified to conduct the proposed work. The laboratory will have and follow a QA program approved by EPA. If a laboratory not in the Contract Laboratory Program ("CLP") is selected, methods consistent with CLP methods that would be used for the purposes proposed and QA/QC procedures approved by EPA will be used. Respondents shall provide assurances that EPA has access to laboratory personnel;

equipment; and project records for sample collection, transportation and analysis for the purpose of QA/QC review.

2.3.3 Site Health and Safety Plan

A plan entitled Site Health and Safety Plan, will be prepared in accordance with OSHA regulations and protocols and submitted to EPA for review. The plan will include a description of the potential physical, chemical and radiological risks present; a description of monitoring and personal protective equipment; medical monitoring; and facility control. Field personnel will conform to regulatory training requirements as applicable.

3.0 TASK II - COMMUNITY RELATIONS

The development and implementation of community relations activities are the responsibility of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, Respondents may assist by providing information regarding the Site's history, participating in public meetings, or by preparing fact sheets for distribution to the general public.

Two or more Baseline Risk Assessment memoranda will be prepared by EPA which will summarize the toxicity assessment and exposure assessment components of the baseline risk assessment. EPA will make these memoranda available to all interested parties for comment and place them in the Administrative Record. In addition, Respondents may establish a community information repository, at or near the Site, to house a copy of the administrative record. The extent of Respondents involvement in community relations activities is left to the discretion of EPA. Respondents' community relations responsibilities, if any, are specified in the community relations plan. All Respondents-conducted community relations activities relating to the Site shall be subject to oversight by EPA.

4.0 TASK III - SITE CHARACTERIZATION

As part of the RI, Respondents shall perform the activities described in this Task, including the preparation of a Site Characterization Summary Report and a RI Report. The overall objective of Site characterization is to describe areas of a Site that may pose a threat to human health or the environment. This is accomplished by first determining a Site's physiography, geology, and hydrology. Surface and subsurface pathways of migration shall be defined. Respondents must identify the sources of contamination within Radiological Areas 1 and 2; and define the nature, extent, and volume of the sources of contamination in Radiological Areas 1 and 2, including their physical and chemical character as well as their concentrations at incremental locations to background in the affected media. Respondents shall also investigate the extent of migration of contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, contaminant fate and transport is then determined and projected.

During this phase of the RI/FS, the RI/FS Work Plan, SAP, and Site Health and Safety Plan are implemented. Field data are collected and analyzed to provide the information required to accomplish the objectives of the study. Respondents must orally notify the EPA project coordinator 14 days in advance of the field work regarding the planned dates for field activities, including ecological field surveys, field layout of the sampling grid, excavation, installation of wells, initiating sampling, installation and calibration of equipment, pump tests, and initiation of analysis and other field investigation activities. If delays occur outside of the planned schedule, the Respondents will orally notify the EPA project coordinator and adjust the field schedule accordingly. In addition to the deliverables below, Respondents must provide monthly progress reports and participate in meetings with EPA at major points in the RI/FS.

4.1 Field Investigation

Field investigation includes the gathering of data to define Site physical and biological characteristics, sources of contamination, and the nature and extent of contamination at the Site. These activities shall be performed by Respondents in accordance with the RI/FS Work Plan and SAP. This shall include performance of the activities as discussed in the following sections.

4.1.1 Implement And Document Field Support Activities

Respondents shall initiate field support activities following approval of the RI/FS Work Plan and SAP. Field support activities may include obtaining access to the Site, scheduling, and procuring equipment, office space, laboratory services, and/or contractors. Respondents must notify the EPA project coordinator 14 days prior to initiating field support activities so that EPA may adequately schedule oversight tasks. Respondents shall also orally notify the EPA Project Coordinator upon completion of field support activities.

4.1.2 Interim Investigation

An Interim Investigation will be conducted as an initial activity of the field investigation. The Interim Investigation will have as a primary objective the determination of the risks from exposure to radioactive emissions from the Site. The Interim Investigation will include a preliminary evaluation of the nature and magnitude of radioactive emissions from the Site and selected radionuclides in soil; determination if erosion of contaminated soil is occurring along the berm located on the northwestern boundary of Radiological Area 2; identification of an interim erosion control measures if warranted; and providing security to restrict Site access as appropriate.

The specific activities and procedures to be conducted during the Interim Investigation will be proposed for EPA review and approval in the RI Work Plan. The Interim Investigation of the Site will include a surface gamma and beta-gamma survey; soil sampling and analysis to confirm the extent of occurrence, as identified in previous studies; and the magnitude of alpha-emitting radionuclides. The results will be compared to appropriate, acceptable exposure levels. The selected radionuclides to be addressed during the Interim Investigation will be determined during the scoping process and approved by EPA. Additionally a careful visual inspection will be made to locate any erosional pathways from the Site. The area, defined during the Interim Investigation, will be secured to prevent unauthorized access by the general public.

At the completion of the Interim Investigation, a technical memorandum entitled Interim Investigation Results will be prepared for EPA review and approval explaining the methods used in the radiological survey, results, and recommended action, if needed. If EPA determines, based on the Interim Investigation Results, that interim measures are required, Respondents shall submit to EPA an Interim Action Work Plan within thirty (30) days of receipt of EPA's determination. If EPA disapproves of, or requires revisions to, the Interim Action Work Plan, in whole or part, Respondents shall revise and submit to EPA a revised Interim Action Work Plan which is responsive to all of EPA's comments within ten (10) days of receiving EPA's comments.

4.1.3 Investigate And Define Site Physical And Biological Characteristics

Respondents shall collect data on the physical and biological characteristics of the Site and its surrounding areas including the physiography, geology, hydrology, and specific physical characteristics identified in the RI/FS Work Plan. This information shall be ascertained through a combination of physical measurements, observations, and sampling efforts and will be utilized to define potential transport pathways and human and ecological receptor populations. In defining the Site's physical characteristics Respondents shall also obtain sufficient engineering data (such as pumping characteristics) for the projection of contaminant fate and transport, and development and screening of remedial action alternatives, including information to assess treatment technologies.

The demographics of the region surrounding the Site will be evaluated, updated, and expanded, as necessary to meet the project objectives and to provide an appropriate and adequate understanding of the following issues:

- Land use and population in the vicinity of the Site;
- The ecological setting of the Site and surrounding vicinity; and
- The biological setting including an analysis of the flora and fauna, any critical habitats and endangered species in the vicinity of the Site.

4.1.4 Define Sources Of Contamination

Respondents shall locate the source of contamination within Radiological Areas 1 and 2. For each location, the areal extent of radiological constituents and depth of contamination shall be determined by sampling radiological constituents at incremental depths at appropriate sampling locations. The physical characteristics and chemical constituents and concentrations shall be determined for all known and discovered sources of contamination within Radiological Areas 1 and 2. Respondents shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the QA/QC plan and DQOs. Defining the source of contamination shall include analysis of the potential for contaminant release; contaminant mobility and persistence; and the characteristics necessary for evaluating remedial actions and treatment technologies.

The following issues will be addressed to define the potential sources of impact from the Site.

- Evaluation of disposal practices at the Site to determine the types of materials disposed, the location of disposal activities, and the period of disposal. This may be accomplished by conducting interviews with past employees, a critical review of aerial photographs and subsurface investigations.
- Definition of the horizontal and vertical extent of the contamination, and impacted soils and groundwater.
- Characterization of surface radioactive emissions (e.g. gamma survey) in the vicinity of the Site.
- Identification of potential mechanisms of release, and/or transport and potential human and environmental receptors.

4.1.5 Physical And Chemical Characterization

Data collected during the field investigation will enable characterization of the physical framework of the materials at and beneath the Site; and evaluation of potential contaminant distribution and concentration in those materials. Activities to address physical and chemical characterization of these media are discussed in the following sections.

4.1.5.1 Soil And Bedrock Characterization

The physical framework and chemical quality of the soil and bedrock at and beneath the Site will be determined. Characterization activities will include, but not be limited to, the following issues.

- Characterization of the lithology and stratigraphy of the soils and bedrock at and beneath the Site.
 - Soil characteristics such as soil type, holding capacity, biological activity, engineering properties, soil temperature, solubility, ion speciation, adsorption coefficients, leachability, mineral partition coefficients, cation exchange capacity, and chemical and sorptive properties will be evaluated as such relate to potential occurrence and migration of any contaminants.
 - The physical characterization of the unconsolidated profile must include an evaluation of unit morphology, unit thickness, areal thickness, areal extent and local lateral facies changes, and hydraulic properties.
 - Bedrock characteristics such as bedrock stratigraphy, bedrock topography, karstic features, geologic, structural features, mineralogy, cementation, porosity, permeability and other hydraulic properties will be evaluated as such relate to potential occurrence and migration of any contaminants.
- Determination of the areal and vertical extent of the contaminants. Initial chemical characterization samples will be analyzed for selected radionuclides, volatile and nonvolatile organic compounds, total petroleum hydrocarbons, pesticides, PCBs, metals, and cyanides. Based on the results of initial sampling, the analyte list may be reduced to a more focused suite of chemicals.
- Determination of contaminant migration pathways and the persistence of the contaminants and related impacts.
- Determination of the extent of leachate migration in soil and bedrock adjacent to potential sources.

4.1.5.2 Hydrogeologic Framework And Groundwater Contamination

The hydrogeologic framework and the extent of potential groundwater impact associated with the contaminants in or originating from the Site will be characterized. Characterization activities will address, but not be limited to, the following issues.

- Determination of the nature of groundwater occurrence and flow beneath and in the vicinity of the Site which may include collection of monthly water levels, performance of aquifer testing, water balance calculations, evaluation of seasonal fluctuation in groundwater levels, seasonal gradient, flow rates and directions, transient gradients and impact to nearby surface water as such relate to potential occurrence and migration of any contaminants.
- Determination of the areal and vertical extent of the contaminants. Initial samples will be analyzed for selected radionuclides, volatile and nonvolatile organic compounds, total petroleum hydrocarbons, pesticides, PCBs, metals, and cyanides. Based on the results of initial sampling, the analyte list may be reduced to a more focused suite of chemicals.
- Determination of contaminant migration pathways and the persistence of the contaminants and related impacts.
- Determination of seasonal variations in groundwater chemistry.
- Determination of groundwater flow conditions at and adjacent to the Site to include, but not limited to, the analysis of hydrologic relationships between the Site and the Mississippi River and impact to surface water quality.

4.1.5.3 Surface Water And Sediment Condition

The hydrologic framework and condition of nearby surface water and sediment associated with the contaminants in or originating from the Site will be characterized. Characterization activities will include, but not be limited to, the following issues.

- Collection of climatic and river stage data.
- Determination of surface drainage patterns.
- Determination of the areal and vertical extent of potential surface water and sediment impact and general surface water quality. Initial samples will be analyzed for selected radionuclides, volatile and nonvolatile organic compounds, total petroleum hydrocarbons, pesticides, PCBs, metals, and cyanides. Based on the results of initial sampling, the analyte list may be reduced to a more focused suite of chemicals.
- Determination of potential migration pathways and the persistence of the contaminants and related impacts.
- Determination of the seasonal variations in surface water chemistry.

4.1.6 Atmospheric Dispersion

The atmospheric dispersion of airborne radionuclides has been described in previous investigations. This data will be summarized and evaluated to determine the need for further investigations and monitoring.

4.1.7 Climate

Climatic data presented in previous investigation reports should be supplemented with current data. This information will be needed to evaluate the Site water balance, determine groundwater recharge characteristics in the vicinity of Radiological Areas 1 and 2, determine surface water/groundwater interactions, evaluate seasonal groundwater variations, determine the potential volume of leachate generated in the vicinity of Radiological Areas 1 and 2, etc.

4.1.8 Describe the Nature and Extent of Contamination

Respondents shall gather information to describe the nature and extent of contamination as a final step during the field investigation. To describe the nature and extent of contamination, Respondents shall utilize the information on Site physical and biological characteristics and sources of contamination to give a preliminary estimate of the

contaminants that may have migrated. Respondents shall then implement an iterative monitoring program and any study program identified in the RI/FS Work Plan or SAP such that by using analytical techniques sufficient to detect and quantify the concentration of contaminants, the migration of contaminants through the various media at the Site can be determined. In addition, Respondents shall gather data for calculations of contaminant fate and transport. This process is continued until the area and depth of contamination are known to the level of contamination established in the QA/QC plan and DQOs. EPA will use the information on the nature and extent of contamination to determine the level of risk presented by the Site. Respondents shall use this information to help to determine aspects of the appropriate remedial action alternatives to be evaluated.

4.2 Data Analyses and Evaluation of Site Characteristics

Respondents shall analyze and evaluate the data to describe: (1) Site physical and biological characteristics, (2) contaminant source characteristics, (3) nature and extent of contamination and (4) contaminant fate and transport. Results of the Site physical characteristics, source characteristics, and extent of contamination analyses will be utilized to evaluate contaminant fate and transport. The evaluation shall include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models must be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. The RI data shall be presented in a format (i.e. computer disc or equivalent) to facilitate EPA's preparation of the baseline risk assessment. Respondents shall discuss and then collect any data gaps identified by the EPA that is needed to complete the baseline risk assessment. (See "Guidance for Data Useability in Risk Assessment" OSWER Directive 9285.7-05, October 1990.) Also, this evaluation shall provide any information relevant to Site characteristics necessary for evaluation of the need for remedial action in the baseline risk assessment and for the development and evaluation of remedial alternatives. Analyses of data collected for Site characterization shall meet the DQOs developed in the QA/QC plan stated in the SAP (or revised during the RI).

A Baseline Risk Assessment will need to include all the principal radionuclides, including U-238, U-234, U-235, Th-230, Ra-226, Pb-210, Pa-231, and Ac-227, except for any that can be shown not to be significant.

4.3 Data Management Procedures

The quality and validity of field and laboratory data compiled during the RI will be adequately and consistently documented during performance of the RI/FS.

4.3.1 Document Field Activities

Information gathered during site characterization will be consistently documented and adequately recorded in well maintained field logs and laboratory reports. The method(s) of documentation will be specified in the RI/FS Work Plan and/or the SAP. Field logs will be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports will document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

4.3.2 Maintain Sample Management and Tracking

Field reports, sample shipment records, analytical results, and QA/QC reports will be maintained to ensure that only validated analytical data are reported and utilized in the development and evaluation of remedial alternatives. Analytical results developed under the RI/FS Work Plan will not be included in any site characterization reports unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, a data security system will be established to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

4.4 Site Characterization Deliverables

As Interim Investigation technical memorandum will be submitted during the early phases of implementation of RI field activities upon completion of the Interim Investigation. A Preliminary Site Characterization Summary will be prepared and submitted to EPA prior to preparation of the Baseline Risk Assessment. The Remedial Investigation Report will be prepared upon completion of the Baseline Risk Assessment. A description of these deliverables follows.

4.4.1 Interim Investigation Technical Memorandum

At the completion of the Interim Investigation, a technical memorandum entitled Interim Investigation Results will be prepared for EPA review and approval explaining the methods used in the radiological survey, results, and recommended action, if needed.

4.4.2 Site Characterization Summary

After the field sampling and analysis is completed, a report entitled Site Characterization Summary Report will be prepared for EPA for use in preparing the Baseline Risk Assessment. This summary will review the investigative activities that have taken place, and describe and display data documenting the location and characteristics of surface and subsurface features and contamination at the site including the affected medium, location, types, physical state, concentration of the contaminants and quantity. In addition, the location, dimensions, physical condition, and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media will be documented.

4.4.3 Remedial Investigation (RI) Report

A draft RI Report will be prepared and submitted to EPA for review and approval. The report entitled Draft Remedial Investigation Report will summarize results of field activities to characterize the Site, sources of contaminants, nature and extent of contaminants and associated impacts and the fate and transport of the contaminants. Following comment by EPA, the draft RI report will be revised and resubmitted as the Final Remedial Investigation Report for final EPA review and approval.

5.0 TASK IV - TREATABILITY STUDIES

The potential need for treatability testing will be evaluated. Based on the results of the evaluation, a technical memorandum entitled Evaluation of Need for Treatability Studies will be prepared and submitted to EPA stating whether, in Respondents' opinion, a treatability study is warranted.

It treatability testing is deemed necessary, treatability testing will be performed by Respondents during Phase II to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions will be used in the detailed design of the selected remedial technology. The following activities will be performed by Respondents.

5.1 Identification of Candidate Technologies and of the Need for Testing

Respondents will identify in a technical memorandum entitled Candidate Technologies for Treatability Studies, subject to EPA review and approval, candidate technologies for a treatability studies program during scoping. The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The specific data requirements for the testing program will be determined and refined during Site characterization and the development and screening of remedial alternatives.

5.1.1 Conduct Literature Survey and Determine the Need for Treatability Testing

Respondents will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance ("O&M") requirements, and implementability of candidate technologies. If practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for this Site on the basis of available information, treatability testing will be conducted. Where it is determined by EPA that treatability testing is required, and unless Respondents can demonstrate to EPA's satisfaction that they are not needed, Respondents will develop and discuss with EPA a treatability testing scope of work outlining the steps and data necessary to evaluate and initiate the treatability testing program.

5.1.2 Evaluate Treatability Studies

Once a decision has been made to perform treatability studies, Respondents and EPA will decide on the type of treatability testing to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as perform testing for various operating conditions, the decision to perform pilot testing should be made as early in the process as possible to minimize potential delays of the FS. To assure that a treatability testing program is completed on time, and with accurate results, Respondents will either submit a separate treatability testing work plan or an amendment to the original RI/FS Work Plan for EPA review and approval.

5.2 Treatability Testing and Deliverables

The deliverables that are required, in addition to the memorandum identifying candidate technologies, where treatability testing is conducted include a work plan, a sampling and analysis plan, and a final treatability evaluation report. EPA may also require a treatability study health and safety plan, or an amendment to the Site Health and Safety Plan.

5.2.1 Treatability Testing Work Plan

Respondents will prepare a plan entitled Treatability Testing Work Plan or an amendment to the original RI/FS Work Plan for EPA review and approval describing the Site background, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for treatability testing will be documented as well. If pilot scale treatability testing is to be performed, the pilot-scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed off-Site, permitting requirements will be addressed.

5.2.2 Treatability Study Sampling and Analysis Plan
 ("SAP")

If the original QAPP or FSP is inadequate for defining the activities to be performed during the treatability tests, a separate treatability study SAP or amendment to the original Site SAP will be prepared by Respondents for EPA review and approval. Task I, Section 2.3.2 of this SOW provides additional information on the requirements of the SAP.

5.2.3 Treatability Study Site Health and Safety Plan

If the original Site Health and Safety Plan is inadequate for defining the activities to be performed during the treatment tests, a separate or amended health and safety plan will be developed by Respondents. Task I, Section 2.3.3 of this SOW provides additional information on the requirements of the health and safety plan. EPA does not "approve" the treatability study health and safety plan.

5.2.4 Treatability Study Evaluation Report

Following completion of treatability testing, Respondents will prepare a report, delivered to the EPA for review and approval entitled Treatability Study Evaluation Report which analyzes and interprets the testing results. Depending on the sequence of activities, this report may be a part of the Remedial Investigation Report or a separate deliverable. The report will evaluate each technology's effectiveness, implementability, cost, and actual results as compared with predicted results. The report will also evaluate full scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale-operation.

6.0 TASK V - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

A range of appropriate waste management options that ensure protection of human health and the environment will be developed and screened in this task concurrently with Task III (Site Characterization). This range of alternatives should include as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; options involving containment with little or no treatment; options involving both treatment and containment; and a no-action alternative. The Respondents will perform the following activities as a function of the development and screening of remedial alternatives.

6.1 Develop Remedial Alternatives

A range of appropriate waste management options will be developed that ensure protection of human health and the environment. This development will occur concurrently with Task III (Site Characterization).

6.2 Refine and Document Remedial Action Objectives

The site specific remedial action objectives will be reviewed and modified if necessary. The revised Site-specific remedial action objectives will be documented in a technical memorandum entitled Refined Remedial Action Objectives that will be reviewed and approved by EPA. The refined remedial action objectives will specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route).

6.3 Develop General Response Action

General response actions will be developed for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy the remedial action objectives.

6.4 Identify Areas or Volumes of Media

Areas or volumes of media to which general response actions may apply will be identified.

6.5 Identify and Screen Remedial Technologies

Technologies applicable to each general response action will be identified and evaluated to eliminate those that cannot be implemented. The general response actions will be refined to specify remedial technology types. Technology process options for each of the technology types will be identified either concurrent with the identification of technology types, or following the screening of the considered technology types. Process options will be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each technology type. The reasons for eliminating alternatives will be specified.

6.6 Assemble Alternatives

Selected representative technologies will be assembled into alternatives for each affected medium. Together, all of the alternatives will represent a range of treatment and containment combinations that will address the Site. The reasons for eliminating alternatives during the preliminary screening process will be specified.

6.7 Refine Alternatives

The remedial alternatives will be refined, taking into account contaminant volume, proposed process, and sizing of critical unit operations. Site specific remediation objectives for each chemical in each medium will also be modified as necessary to incorporate any applicable risk assessment information presented in the Baseline Risk Assessment report. Additionally, action-specific ARARs will be updated as necessary.

6.8 Conduct Screening Evaluation of Each Alternative

Respondents may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. As appropriate, the screening will preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives will include options that use treatment technologies and permanent solutions to the maximum extent practicable.

6.9 Alternatives Development and Screening Deliverables

A report entitled Development and Screening of Remedial Alternatives will be prepared summarizing the work performed in and the results of each task above, including an alternatives array summary for EPA review and approval. This deliverable at a minimum will document the methods, rationale, summary of the assembled alternatives and their related action-specific ARARs, and results of the alternatives screening process including the identification of the action-specific ARARs for the alternatives that remain after screening.

7.0 TASK VI - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

A detailed analysis of remedial alternatives will be conducted to provide EPA with the information needed to allow for the selection of a remedy. This analysis is the final task to be performed during the FS.

7.1 Detailed Analysis of Remedial Alternatives

A detailed analysis of remedial alternatives will be conducted consisting of an analysis of each option against a set of nine evaluation criteria and a comparative analysis of all options using the same evaluation criteria as a basis for comparison.

7.1.1 Apply Nine Criteria and Document Analysis

The following nine evaluation criteria will be applied to the assembled remedial alternatives: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (or support agency) acceptance; and (9) community acceptance. For each alternative the following will be provided: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment.

7.1.2 Compare Alternatives Against Each Other and Document the Comparison of Alternatives

A comparative analysis will be performed between the remedial alternatives by using the nine evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by EPA. A technical memorandum entitled Comparison of Alternatives will be submitted to the EPA for review and approval which provides a comparative analysis of the alternatives.

7.2 Detailed Analysis Deliverables Feasibility Study (FS) Report

Respondents shall prepare a Draft FS Report for EPA review and comment. This report, as ultimately adopted or amended by EPA, provides a basis for remedy selection by EPA and documents the development and analysis of remedial alternatives. Respondents should refer to the Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, October 1988) for an outline of the report format and the required report content. Respondents shall prepare a Final FS Report which satisfactorily addresses EPA's comments and is approved by EPA.

8.0 SUMMARY OF DELIVERABLES

The following is a table summarizing the RI/FS deliverable documents.

TASK/DELIVERABLE

EPA ACTION

TASK I - SCOPING

- **Work Plan:**

Draft RI/FS Work Plan	Review and Comment
Final RI/FS Work Plan	Review and Approve
Draft Sampling and Analysis Plan (SAP)	Review and Comment
Final Sampling and Analysis Plan (SAP)	Review and Approve
Site Health and Safety Plan	Comment
Interim Action Work Plan (if needed)	Review and Approve

TASK II - COMMUNITY RELATIONS PLAN

None

TASK III - SITE CHARACTERIZATION

- **Technical Memorandum:**

Draft Interim Investigation Results	Review and Comment
Final Interim Investigation Results	Review and Approva
Modeling of Site Characteristics (if needed)	Review and Approva

- **Technical Report:**

Site Characterization Summary Report	Review and Approv
Draft Remedial Investigation (RI) Report	Review and Comment
Final Remedial Investigation Report	Review and Approv

TASK IV - TREATABILITY STUDIES

- **Technical Memorandum:**

Evaluation of Need for Treatability Studies	Review and Approve
Candidate Technologies For Treatability Studies (if needed)	Review and Approve

- **Work Plan:**

Treatability Testing Work Plan (or amendment to RI/FS Work Plan, if needed)	Review and Approve
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Treatability Study SAP (or amendment to original, if needed)	Review and Approve
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Treatability Study Site Health and Safety Plan (or amendment to original, if needed)	Review and Approve
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- **Technical Report:**

Treatability Study Evaluation Report (if needed)	Review and Approve
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TASK V - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

- **Technical Memorandum:**

Refined Remedial Action Objectives	Review and Approve
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- **Technical Report:**

Development and Screening of Remedial Alternatives	Review and Approve
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TASK VI - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

- **Technical Memorandum:**

Comparison of Remedial Alternatives

Review and Approve

- **Technical Report:**

Draft Feasibility Study (FS) Report

Review and Comment

Final Feasibility Study (FS) Report

Review and Approve

MISCELLANEOUS

- **Monthly Status Reports**

9.0 REFERENCES

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process:

The National Contingency Plan, 40 C.F.R. Part 300.

"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01.

"Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

"Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, OSWER Directive No. 9835.3

"A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

"EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, EPA-330/9-78-001-R.

"Data Quality Objectives for Remedial Response Activities," U.S. EPA Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

"Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH QAMS-004/80, December 29, 1980.

"Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response QAMS-005/80, December 1980.

"Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, August 1982.

"Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

"CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234.1-01 and -02.

"Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (draft), OSWER Directive No. 9283.1-2.

"Draft Guidance on Preparing Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355.3-02

"Risk Assessment Guidance for Superfund - Volume I Human Health Evaluation Manual (Part A)," December 1989, EPA/540/1-89/002

"Risk Assessment Guidance for Superfund - Volume II Environmental Evaluation Manual," March 1989, EPA/540/1-89/001

"Guidance for Data Useability in Risk Assessment," October, 1990, EPA/540/G-90/008

"Performance of Risk Assessments in Remedial Investigation /Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," August 28, 1990, OSWER Directive No. 9835.15.

"Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions," April 22, 1991, OSWER Directive No. 9355.0-30.

"Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

OSHA Regulations in 29 C.F.R. § 1910.120.

"Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March 1, 1989, OSWER Directive No. 9833.3A.

"Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0#3B.

"Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1A.

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"Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites", U.S. EPA, Office of Emergency Remedial Response, February 1991, EPA Doc. No. EPA/540/P-91/001.2